REMARKS

Claims 1-15 and 20-26 are pending in the application. Claims 1-11, 13 and 20-24 have been rejected. Claims 25 and 26 have been allowed. Claims 12, 14 and 15 have been objected to. Claims 16-19 have been previously cancelled.

Applicant has amended Claims 3 and 4 to provide an antecedence correction. No new matter is hereby being introduced with these amendments.

Claims 1 and 11 have been objected to because of certain noted informalities.

In response, Applicant has amended Claims 1 and 11, following the suggestions made by the Examiner. No new matter is hereby being introduced with these amendments.

In view of the foregoing, Applicant believes that the objection to Claims 1 and 11 has now been overcome and respectfully requests that this objection be withdrawn.

Claims 1, 2 and 20-24 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claims the subject matter which applicant regards as the invention.

The Examiner makes specific reference to Claims 1 and 20.

In response, Applicant has amended Claims 1 and 20, following the suggestions made by the Examiner. No new matter is hereby being introduced with these amendments.

In view of the foregoing, Applicant believes that the rejection to Claims 1 and 20 and Claims 2 and 21-24 dependent therefrom has now been overcome and respectfully requests that this rejection be withdrawn.

Claims 1 and 3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. Re. 34,559 to Mickowski in view of U.S. Patent No. 4,563,271 to Schroder et al. (hereinafter "Schroder").

Applicant has further amended Claims 1 and 3 to clarify that the theoretical slide displacement curve refers to a no-load condition. In particular, the applicable limitations of Claims 1 and 3 (as amended) now recite a theoretical <u>no-load</u> slide displacement curve. (Emphasis added). No new matter is hereby being introduced with these amendments. Support for this amendment may be found in the original disclosure, for example, at Figs. 4-5 and in the specification at Page 15, lines 17-24; Page 16, lines 14-20; Page 17, lines 14-19; and Page 18, line 5 to Page 19, line 15.

Applicant believes that these amendments to Claims 1 and 3 present no new issues and require no further searching on the part of the Examiner. The no-load characterization of the theoretical slide displacement curve is a claimed feature that was present in similar limitations of other pending claims under consideration at the time the Final Office Action was issued. (See Claims 5, 6, 14, and 25). Accordingly, Applicant respectfully requests entry of these amendments.

Regarding the rejection, Applicant believes that even if Mickowski was modified by Schroder in the manner proposed by the Examiner, the resulting combination would not produce the invention.

Regarding Claim 1, Mickowski and Schroder, considered alone or in combination, neither teach nor suggest, *inter alia*, the Claim 1 limitations directed (in relevant part) to "generating a <u>theoretical no-load</u> distance above bottom dead center for each increment of a slide

stroke" and "plotting the generated theoretical no-load distance above bottom dead center values vs. time" (as amended). (Emphasis added).

Likewise, regarding Claim 3, Mickowski and Schroder, considered alone or in combination, neither teach nor suggest, *inter alia*, the Claim 3 limitations directed (in relevant part) to a "computer processor means for generating a theoretical no-load slide displacement curve" (as amended). (Emphasis added).

By way of overview of the rejection, the referenced "master profile" of Mickowski and the "idealized theoretical" stroke diagram of Schroder refer to actual production runs (i.e., load conditions), not theoretical no-load conditions as set forth in the claims.

In the rejection, regarding the claim limitations pertaining to the theoretical slide displacement recitation, the Examiner states as follows in relevant part (emphasis added):

> Mickowski discloses … transducers sense and supply velocity data, … to the microprocessor … as a function of stroke position (i.e. ram/slide displacement above dead bottom center) during a production cycle (col. 4, lines 23-33).
>
> Mickowski also discloses ... plotting, on the display, the velocity as a function of displacement and a superimposed theoretical profile in order to compare the actual and theoretical curves ... (column 4, lines 46-50 and 57-66).

The purported theoretical curve identified by the Examiner for satisfying the applicable claim limitation relates to the master profile of Mickowski. However, the master profile is not a theoretical no-load profile but relates to a production-based trace constructed from transducer readings obtained as the ram undergoes a production cycle, i.e., the master profile relates to an actual load condition and not a theoretical no-load condition. The sections of Mickowski referenced by the Examiner and other relevant sections thereof are set forth below in pertinent part (emphasis added):

> An illustrated display of a typical profile 14 representative of the velocity of the injection ram for a production cycle as a function of stroke position, i.e., the position of the reciprocating injection ram along the stroke length, is shown on the CRT 6. (Col. 4, lines 46-50).
>
> One of the superimposed traces may represent a master profile defined as an idealized or acceptable profile and may simply represent a previously recorded profile. (Col. 4, lines 62-65).
>
> By providing this ability to superimpose master profiles over a current profiles, a non-technically trained person can readily distinguish between a master trace identifying a production run classified as acceptable or good and the current production run representing the current profile. (Col. 5, lines 8-13).

Accordingly, the master profile/trace of Mickowski does not satisfy the applicable limitations in Claims 1 and 3 pertaining to the theoretical no-load slide displacement curve and theoretical no-load distance above bottom dead center.

Therefore, the combination proposed by the Examiner does not teach or suggest the invention as recited in Claims 1 and 3 (as amended).

Schroder is completely inapplicable to the invention. Schroder does not at all relate to any form of machinery even remotely similar to the apparatus of the invention, much less a mechanical press having a reciprocating slide, and still even less a theoretical no-load slide displacement curve. The invention pertains to mechanical presses that employ a reciprocating slide having a die mounted to its free end in opposed relation to the bed assembly. The tooling die cyclically contacts a workpiece stationed on the bed assembly as the slide reciprocates through its vertical travel. The press machine processes the workpiece in a stamping or drawing operation, for example.

Schroder, however, discloses nothing even resembling the illustrative press machinery shown in Fig. 2 of the disclosure. As shown in Fig. 1, Schroder relates to a jig operation where a

series of double-acting hydraulic piston-cylinder arrangements (9-10) located at respective jig stations each reciprocates a respective material carrier 4 that receives coal as it is being transported in conveyor-like fashion from one jig setup to the next, after entering through supply hopper 18. At each jig site, the vertical movement of the respective carrier 4 causes a different respective product (22-23-24) to settle out of the conglomerate mixture into individual settlement sections (1-2) through respective discharge gates 14. The carrier 4 is submerged and movable within a stationary settling tub 3 filled with water, to promote agitated movement and dispersal of the minerals throughout the water medium. This agitation causes the desired separation of minerals and allows certain minerals to settle out of the mixture into the respective settlement sections. (See Fig. 1; Col. 2, lines 3 *et seq.*). Clearly, Schroder is totally unrelated to the field of the invention. Accordingly, Applicant believes that the rejection is improper at least to the extent that it relies upon and applies the teachings of Schroder.

In view of the foregoing, the stated "vertical displacement of a slide" allegedly found in Schroder is incorrect to the extent that this assertion by the Examiner purports to find a correspondence between such "slide" and the mechanical press of the invention. The Schroder disclosure referenced by the Examiner states as follows in relevant part (emphasis added):

> In operation the freely suspended material carrier of the percussion jig according to the invention moves to and fro in a straight line in the vertical direction and therefore the material carrier can be guided by simple structural means. (Col. 1, lines 40-44).
>
> In the embodiment according to FIG. 5 a guide rail 35 of triangular cross-section is provided in the region of the two guide units 12, 13 (FIG. 2) on the periphery of the material carrier 4 and is in sliding contact with two slide parts 36, 37 which are arranged on the inner periphery of the settling tub 3 and are adjustable from the exterior by means of setscrews 38, 39. ... The way in which this guiding arrangement operates during the movement of the material carrier 4 perpendicular

> to the drawing plane of FIG. 5 should be readily understood. (Col. 2, lines 64 et seq.).

Clearly, from Fig. 5, the slide parts 36, 37 are not reciprocating elements of a mechanical press but merely components that cooperate with guide rail 35 to facilitate guidance of material carrier 4 in its vertical movement. The slide parts 36, 37 of Schroder bear no relationship at all to a mechanical press slide of the invention.

Nevertheless, as with Mickowski, Applicant believes that Schroder also does not disclose the claim recitations pertaining to the theoretical no-load slide displacement curve. As cited by the Examiner, Schroder discloses in relevant part (emphasis added):

> With the aid of FIGS. 7 to 12 an embodiment of the percussion jig ... is explained in which an electronically controlled hydraulic drive construction having an adjustable stroke diagram is provided.
>
> Exhaustive experiments by the inventors with synthetic mixtures of coal and quartz sand and with natural rawfine coal showed that there is no single optimum diagram of the lifting and lowering movement for the successive separating processes in a percussion jig.
>
> FIGS. 7 to 10 show four idealized theoretical basic forms of the stroke diagram ... (Col. 3, lines 26-42).
>
> The double-acting hydraulic cylinder 55 is controlled via a proportional valve 64 by a PID controller 65 which is connected to a setting means and a displacement pickup 66 connected to the piston of the hydraulic cylinder 55 in order to form a closed position control circuit. The setting means is formed by a curve creator 67 and a voltage-controlled oscillator 68 the outputs of which are connected to the theoretical value input of the PID controller 65.
>
> Thus the path of the piston of the hydraulic cylinder 55 follows the theoretical value which is variable with time according to the chosen stroke diagram. (Col. 4, lines 18-30).

In Schroder, the displacement of the hydraulic cylinder 55 is governed by theoretical values provided by the selected stroke diagram, which is constructed from actual production

operations, namely, the "exhaustive experiments ... with synthetic mixtures of coal", and therefore not a no-load condition.

Additionally, regardless of the nature of the "theoretical values" disclosed by Schroder in relation to the stroke diagrams (i.e., load versus no-load), these "theoretical values" bear no relationship at all to slide displacement, as this term is understood in the invention, namely, a mechanical press environment. The "theoretical values" in Schroder pertain to stroke diagrams for the hydraulic-piston assembly that reciprocates a material carrier submerged in water, whereas in the invention the theoretical slide displacement pertains to a reciprocating slide in a mechanical press environment.

Essentially, the concept of measuring, determining, and analyzing dynamic deflection that underlies various objects of the invention has no pertinence or application to the arrangements of Schroder, and therefore Schroder cannot be relied upon by the Examiner to satisfy limitations pertaining to no-load mechanical press slide displacement curves. According to one form of the invention, a differential comparison is made between the theoretical no-load slide displacement curve and actual load slide displacement curve to yield a dynamic deflection value indicative of the difference in displacement of the two curves. This value of dynamic deflection may then be used to determine the actual load on the press for any increment of the slide stroke. (See Summary of the Invention section).

As understood in the invention, a load condition occurs when the slide is loaded with its working tool die assembly, i.e., the tooling die is mounted to the end of the slide in working position. However, there is no corresponding operational arrangement in Schroder. Nothing in Schroder embraces or contemplates load and no-load conditions, as understood within the

context of the invention, namely, displacement of a mechanical press slide. The jig operation of Schroder involves sufficiently agitating the coal mixture in water through the reciprocating movement of the material carrier so that desired minerals separate out into the appropriate settlement sections. Clearly, this coal-separation environment does not have a load and no-load condition, as understood in the invention in relation to the reciprocating slide of a mechanical press.

In view of the foregoing, Applicant respectfully submits that Claims 1 and 3 are patentable over Mickowski in view of Schroder and respectfully requests that this rejection be withdrawn.

Claims 2 and 4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mickowski in view of Schroder, and further in view of U.S. Patent No. 5,182,935 to Schockman and U.S. Patent No. 5,099,731 to Eigenmann.

Applicant believes that Claims 2 and 4 are patentably distinguishable over the cited art because they depend respectively from patentable base Claims 1 and 3, as discussed above in connection with the rejection of Claims 1 and 3 over Mickowski in view of Schroder.

Accordingly, Applicant respectfully requests that this rejection be withdrawn.

Claims 5 and 7-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,869,927 to Lose et al. (hereinafter "Lose") in view of U.S. Patent No. 5,997,778 to Bulgrin.

Claim 5 is independent.

The rejection states in relevant part (emphasis added):

> Lose discloses a geared drag link-slider-crank press, and a corresponding method of use, comprising generating a <u>theoretical slide displacement curve</u> for the press,

> and plotting this slide displacement vs. crank angle (column 7, lines 27-37 and Figure 3), …
>
> Lose also discloses that the first plot for displaying the actual slide displacement curve and the second plot for displaying the expected theoretical displacement are for comparing the two graphs to indicate the performance of the press (column 8, lines 21-24).
>
> While the invention of Lose discloses … comparing an actual slide displacement curve to a theoretical slide displacement curve, and while it could be assumed that the theoretical/expected slide displacement corresponds to "no load" conditions, Lose does not specifically state that the theoretical/expected slide displacement curve be under "no load" conditions.
>
> It would have been obvious to one having ordinary skill in the art to modify the invention of Lose to specify that the theoretical/expected slide displacement curve be under "no load" conditions, as taught by Bulgrin, …

It would not be obvious as the Examiner suggests to make the proposed modification of Lose, since to do so would immediately defeat the purpose expressly disclosed by Lose for constructing the superimposed graphs shown in Figs. 3 and 11. Additionally, the statement that "it could be assumed that the theoretical/expected slide displacement corresponds to no load conditions" in Lose is erroneous and totally without foundation.

In Claim 5, the theoretical no load slide displacement curve and actual (loaded) slide displacement curve both relate to the same machine configuration, except that the theoretical curve pertains to no-loading (i.e., the tooling die assembly has not been mounted to the slide) while the actual curve pertains to loading (i.e., the tooling die assembly has been mounted to the slide).

However, in Lose, Fig. 3 is a comparison not between the performance of a specified press configuration under a load and no-load condition, but a comparison between the performance of different machine configurations under the same loading configuration. The

essential purpose of Lose is to provide a geared drag link mechanism capable of providing geared transmission ratios other than the conventional 1:1. (See Col. 4, lines 42-60). In furtherance of this purpose, Lose in Fig. 3 compares the displacement performance of different press configurations, namely, a press arrangement without a geared drag link mechanism (solid line) and a press arrangement with a drag link mechanism (broken line). For the comparison to be meaningful, and support the stated objects of Lose, both curves are developed under the same operating conditions (i.e., load) and relate to different press set-ups (with and without gearing).

The graphical comparison in Fig. 3 would be rendered ineffective and meaningless by the modification proposed by the Examiner, since the graph would no longer display the comparative performance advantages of configuring the slide with a drag link mechanism having a gear ratio other than 1:1, as demonstrated by comparing a geared to non-geared arrangement under the same conditions (loaded). For the graph to be meaningful according to the purposes of Lose, it has to depict the performances of different press gearing mechanisms under the same operating protocol (loaded).

Additionally, within the context of the graphical comparisons shown in Figs. 3 and 11, the concept of dynamic deflection (differential comparison between the theoretical no-load slide displacement curve and actual load slide displacement for the same press machine configuration) has no relevance or application to the efforts and study undertaken by Lose to determine the advantages of constructing gear transmission ratios other than 1:1. (See Col. 14, lines 27-43). To this end, it is considered that Lose teaches away from the modification proposed by the Examiner, since to alter the relationships depicted by the curves shown in Fig. 3 in the manner set forth in the rejection would operate to void the stated purpose of the graphical comparison and deprive

Lose of one of its chief evidentiary demonstrations of how the gearing arrangements of Lose provide improved comparative performance under the same loading conditions.

At Page 16 of the rejection under the Response to Arguments section, the Examiner states as follows in regard to Lose:

> The Examiner first asserts that since Figure 3 [of Lose] displays an actual slide displacement curve, represented by a solid line, superimposed with a theoretical slide displacement curve, represented by the broken line, the invention of Lose does meet the invention as claimed. (Insertion added).

However, contrary to the assertion of the Examiner, the broken line of Fig. 3 in Lose does not meet the various limitations in Claim 5 pertaining to a theoretical <u>no load</u> slide displacement curve. As discussed above, the curves depicted by the solid and broken lines in Fig. 3 of Lose both correspond to load conditions.

Regarding Bulgrin, this reference does not remedy the deficiencies noted above concerning Lose. The general object in Bulgrin is to provide a control system that facilitates velocity profiling for an injection molding machine, where a feedback system is used to adaptively match the actual velocity of the ram to a reference velocity profile. The operation of the control system can be seen in Fig. 3, where there is progressively better tracking of the velocity curves 45-46-47 to the reference profile 40. Regardless of the operating conditions pertaining to these traces (i.e., load or no-load), it is believed that the data represented by these curves is of a kind sufficiently different from the invention that it renders the graphical depictions and teachings related thereto unlike and inapplicable to the subject matter of the invention.

As a general matter, any prior art teaching that merely compares load data to no-load data is insufficient on its own to meet the applicable limitations of Claim 5. As stated above, the

invention relates, *inter alia*, to a method and apparatus that determine dynamic deflection based on a comparison of the theoretical no-load slide displacement curve to the actual load slide displacement curve. The comparison, for example, may be obtained by a measurement of the difference between the two curves at a certain crank position, which yields a measure of dynamic deflection that allows a determination of load. As shown in Figs. 4-5 of the disclosure, the slide displacement curve measures the displacement of the slide as a function of an indicator of press cycle position, e.g., crank angle. It bears noting that the method steps set forth in Claim 5 relate to such slide displacement curves.

In Bulgrin, the data that is monitored and compared is concerned strictly with ram velocity values correlated to the position of the ram. The specific absolute position of the ram as correlated to the injection molding cycle is unimportant to Bulgrin, much less any comparison thereof during a load and no-load condition. However, in the invention, as reflected in the limitations pertaining to the slide displacement curves (i.e., theoretical no-load slide displacement curve and actual slide displacement curve during a load condition), the comparative positions of the slide during load and no-load in relation to the press cycle (e.g., crank angle) is paramount because it provides an indicator of press performance correlated to the press cycle, e.g., dynamic deflection induced by loading.

In view of the foregoing, Applicant respectfully submits that Claims 5 and 7-11 dependent therefrom are patentable over Lose in view of Bulgrin and respectfully requests that this rejection be withdrawn.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Lose in view of Bulgrin, and further in view of Schroder, Schockman, and Eigenmann.

Applicant believes that Claim 6 is patentably distinguishable over the cited art because it depends from patentable base Claim 5, as discussed above in connection with the rejection of Claims 5 and 7-11 over Lose in view of Bulgrin.

Accordingly, Applicant respectfully requests that this rejection be withdrawn.

Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Lose in view of Bulgrin, and further in view of U.S. Patent No. 5,870,254 to Baserman et al. (hereinafter "Baserman").

Applicant believes that Claim 13 is patentably distinguishable over the cited art because it depends from patentable base Claim 5, as discussed above in connection with the rejection of Claims 5 and 7-11 over Lose in view of Bulgrin.

Accordingly, Applicant respectfully requests that this rejection be withdrawn.

The Examiner has objected to Claims 12, 14, and 15 as being dependent upon a rejected base claim, but has indicated that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant believes that Claims 12, 14, and 15 are patentable because they depend from patentably distinguishable base Claim 5, as discussed above in connection with the rejection of Claims 5 and 7-11 over Lose in view of Bulgrin.

Accordingly, Applicant respectfully requests that this objection be withdrawn.

Applicant gratefully acknowledges the Examiner's indication that Claims 25 and 26 are allowable over the cited art.

Applicant believes that the application is now in condition for allowance and respectfully requests favorable action in accordance therewith.

If the Examiner has any questions or comments that would advance prosecution of this case, the Examiner is invited to call the undersigned at 260/484-4526.

Respectfully Submitted,

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RJK/jrw2

Enclosures: Amendments to the Claims
(12 Sheets)
Explanatory Cover Sheet - Page 1
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I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450, on: August 25, 2004

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